

In the column "compositions of sintered body", the contents of Sm_2O_3 , the rare earth oxide and Al_2O_3 were calculated based on the contents obtained by chemical analysis of Sm, rare earth element and oxygen, according to the following procedure.

(Content of Sm_2O_3 : mole percent)

The content of Sm is determined by ICP analysis and then converted to the content of Sm_2O_3 .

(Converted content of second rare earth element calculated as oxide)

The content of a rare earth element (Re) is determined by ICP analysis. The content is then converted to the content of Re_2O_3 . When the rare earth element is cerium, the content of cerium is converted to the content of CeO_2 .

(Content of Al_2O_3)

The total content of oxygen in the sintered body is determined by infrared absorptiometry. Both of the oxygen contents in Sm_2O_3 and in the second rare earth oxide were subtracted from the total content of oxygen to calculate the remaining oxygen. The content of Al_2O_3 was calculated under the provision that all the remaining oxygen atoms constitute Al_2O_3 .

(Content of AIN : mole percent)

The contents of Sm_2O_3 , the oxide of the second rare earth element and Al_2O_3 calculated as described above were subtracted from 100 (mole percent) to provide the content of AIN. Each content of each component was represented using "mole percent" as a unit. This calculation is performed under the provision that total of the contents of AIN, Sm_2O_3 , Al_2O_3 and the oxide of the second rare earth element is 100 mole percent.

(Ratio of the second rare earth element / Sm_2O_3)

The molar ratio of the content of the oxide of the second rare earth

element (converted amount as the oxide) to the content of Sm_2O_3 (converted content as the oxide) was calculated.

(Ratio of total of contents of all the rare earth oxides / Al_2O_3)

The molar ratio of total of the contents of all the rare earth oxides to the content of Al_2O_3 was calculated.

Table 10

	open porosity %	bulk density g/cm ³	resistivity 25 °C $\Omega \cdot \text{cm}$	resistivity 300°C $\Omega \cdot \text{cm}$	activation energy eV	bending strength MPa	thermal conductivity W/ m K	average grain diameter of AlN μm	crystalline phase (excluding AlN)
example 22	0.01	3.29	6.E+11	5.E+08	0.38	539	103	3	SmAlO ₃ , SmAlHfO ₁₈ , Yb ₃ Al ₅ O ₁₂
example 23	0.02	3.29	2.E+11	2.E+08	0.37	501	107	4	SmAlO ₃ , SmAlHfO ₁₈ , Yb ₃ Al ₅ O ₁₂
example 24	0.01	3.28	2.E+11	3.E+08	0.35	452	98	4	SmAlO ₃ , SmAlHfO ₁₈
example 25	0.02	3.29	3.E+12	2.E+09	0.39	420	103	4	SmAlO ₃ , SmAlHfO ₁₈
example 26	0.03	3.31	3.E+12	2.E+09	0.39	448	118	5	SmAlO ₃ , SmAlHfO ₁₈
example 27	0.01	3.28	1.E+12	1.E+09	0.37	448	111	4	SmAlO ₃ , SmAlHfO ₁₈ , Y ₃ Al ₅ O ₁₂
example 28	0.02	3.28	4.E+12	3.E+09	0.39	512	101	4	SmAlO ₃ , SmAlHfO ₁₈
example 29	0.04	3.29	5.E+12	3.E+09	0.40	429	106	4	SmAlO ₃ , SmAlHfO ₁₈
example 30	0.03	3.29	5.E+12	4.E+09	0.38	525	100	3	SmAlO ₃ , SmAlHfO ₁₈
example 31	0.01	3.29	7.E+12	4.E+09	0.40	494	108	4	SmAlO ₃ , SmAlHfO ₁₈
example 32	0.02	3.29	1.E+12	2.E+09	0.33	521	102	3	SmAlO ₃ , SmAlHfO ₁₈ , Er ₃ Al ₅ O ₁₂
example 33	0.03	3.29	2.E+12	2.E+09	0.37	506	114	4	SmAlO ₃ , SmAlHfO ₁₈ , Er ₃ Al ₅ O ₁₂
Comparative example 9	0.01	3.30	1.E+14	4.E+09	0.54	427	104	4	SmAlO ₃ , SmAlHfO ₁₈
Comparative example 10	0.02	3.33	1.E+16	2.E+11	0.58	343	107	4	SmAlO ₃